CLAIMS

1. A method of identifying a compound that is active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16, said method comprising

contacting a candidate compound with said polypeptide, and

detecting binding of said candidate compound to said polypeptide, wherein detection of binding is indicative that said compound is active on said polypeptide.

2. The method of claim 1 wherein said detecting comprises the step of measuring the binding of a candidate compound, wherein the compound is directly or indirectly detectably labeled, to said polypeptide.

3. The method of claim 1 wherein said detecting comprises measurement by phage display.

4. The method of claim 1 wherein said detecting comprises measurement by surface plasmon resonance.

5. The method of claim 1 wherein said detecting comprises measurement by FRET.

6. The method of claim 1 wherein said detecting comprises measurement of fluorescence polarization changes.

7. The method of claim 1 wherein said detecting comprises a scintillation proximity assay.

8. The method of claim 1 wherein said detecting comprises a biosensor assay.

9. The method of claim 1 wherein said compound is selected from the group consisting of a small molecule, a peptidomimetic compound, and a fragment or derivative of a bacteriophage inhibitor protein.

10. The method of claim 1 wherein said active compound is a peptide synthesized by a recombinant expression system and purified, or artificially synthesized.

11. A method of identifying a compound that is active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16, said method comprising the step of:

contacting a first and a second polypeptide in the presence and absence of a candidate compound, wherein said first polypeptide comprises the amino acid sequence of SEQ ID NO: 16 or a fragment or variant thereof that specifically binds phage 77ORF104 and said second polypeptide comprises phage 77ORF104 or a domain thereof that specifically binds a polypeptide of SEQ ID NO: 16, and detecting the binding of said first and said second polypeptides to each other, wherein a decrease in the binding of said first and said second polypeptides in the presence of said candidate compound relative to the binding in the absence of said candidate compound identifies said candidate compound as a compound that is active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16.

12 The method of claim 11 wherein said first or said second polypeptide is directly or indirectly detectably labeled.

13. The method of claim 11 wherein said detecting comprises measurement by phage display.

14. The method of claim 11 wherein said detecting comprises measurement by surface plasmon resonance.

15. The method of claim 11 wherein said detecting comprises measurement by FRET.

16. The method of claim 11 wherein said detecting comprises measurement of fluorescence polarization changes.

17. The method of claim 11 wherein said detecting comprises a scintillation proximity assay.

18. The method of claim 11 wherein said detecting comprises a biosensor assay.

19. The method of claim 11 wherein said the candidate compound is selected from the group consisting of a small molecule, a peptidomimetic compound, and a fragment or derivative of a bacteriophage inhibitor protein.

20. The method of claim 11 wherein said the candidate compound is a peptide synthesized by expression systems and purified, or artificially synthesized.

21. An agonist or an antagonist of the activity of a DnaI polypeptide or a gene encoding said polypeptide.

22. A method of identifying a compound that is active on a DnaI polypeptide, said method comprising the steps of:

contacting a candidate compound with cells expressing a polypeptide comprising SEQ ID NO: 16, and

detecting DnaI activity in said cells, wherein a decrease in activity relative to DnaI activity in cells not contacted with said candidate compound is indicative that said candidate compound is active on a DnaI polypeptide.

23. A method of making an antibacterial compound, comprising the steps of:

determining whether a candidate compound is active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16 or a gene encoding said polypeptide; and

synthesizing or purifying said candidate compound in an amount sufficient to provide a therapeutic effect when administered to an organism infected by a bacterium naturally producing a polypeptide comprising the amino acid sequence of SEQ ID NO: 16.

24. The method of claim 23 wherein the antibacterial compound is selected from the group consisting of a small molecule, a peptidomimetic compound, and a fragment or derivative of a bacteriophage inhibitor protein.

25. The method of claim 23 wherein the antibacterial compound is a peptide synthesized by expression systems and purified, or artificially synthesized.

26. A method for inhibiting a bacterium, comprising contacting said bacterium with a compound active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16 or a gene encoding said polypeptide.

27. The method of claim 26 wherein said contacting is performed in vitro.

28. The method of claim 26 wherein said contacting is performed in vivo in an animal.

29. The method of claim 26 wherein said compound is selected from the group consisting of a small molecule, a peptidomimetic compound, and a fragment or derivative of a bacteriophage inhibitor protein.

30. The method of claim 26 wherein said compound is a peptide synthesized by a recombinant expression system and purified, or artificially synthesized.

31. A method for treating a bacterial infection in an animal suffering from an infection, comprising administering to the animal a therapeutically effective amount of a compound active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16 or a gene encoding the polypeptide.

32. The method of claim 31 wherein said compound is selected from the group consisting of a small molecule, a peptidomimetic compound, and a fragment or derivative of a bacteriophage inhibitor protein.

33. The method of claim 31 wherein said compound is a peptide synthesized by expression systems and purified, or artificially synthesized.

34. A method of prophylactic treatment to prevent bacterial infection comprising contacting an indwelling device with a compound active on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16 before its implantation into a mammal, such contacting being sufficient to prevent *S. aureus* infection at the site of implantation.

35. A method of prophylactic treatment to prevent infection of an animal by a bacterium comprising administering to said animal a compound that is active on a *S. aureus* DnaI polypeptide comprising the amino acid sequence of SEQ ID NO: 16 or a gene encoding the polypeptide in an amount sufficient to reduce adhesion of the bacterium to a tissue surface of said animal.

36. A method of diagnosing in an individual an infection with *Staphylococcus aureus*, comprising:

determining the presence in the individual of a polypeptide comprising the amino acid sequence of SEQ ID NO: 16, wherein the presence of said polypeptide is diagnostic for *S. aureus* infection.

37. The method of claim 36 wherein said determining step comprises contacting a biological sample from said individual with an antibody specific for an epitope present on a polypeptide comprising the amino acid sequence of SEQ ID NO: 16.

38. A method of diagnosing in an individual an infection with Staphylococcus aureus, comprising

determining the presence in said individual of a nucleic acid sequence encoding a polypeptide comprising the amino acid sequence of SEQ ID NO: 16.

39. The method of claim 38 wherein said determining step comprises contacting a nucleic acid sample of said individual with an isolated, purified or enriched nucleic acid probe of at least 15 nucleotides in length that hybridizes under stringent hybridization conditions with the sequence of SEQ ID NO: 1, or the complement of such probe.

40. An isolated, purified or enriched polynucleotide comprising a polynucleotide sequence that has at least 55% identity to the sequence of SEQ ID NO: 1, or the complement of said polynucleotide sequence.

41. An isolated, purified or enriched polynucleotide comprising a sequence encoding the amino acid sequence of SEQ ID NO: 16, or the complement of said polynucleotide.

42. An isolated, purified or enriched polynucleotide comprising SEQ ID NO: 17 or the complement of said polynucleotide sequence.

43. An isolated, purified or enriched polynucleotide consisting of the sequence of SEQ ID NO: 17.

44. An isolated, purified or enriched polypeptide having at least 55% identity to the amino acid sequence of SEQ ID NO: 16.

45. An isolated, purified or enriched polypeptide of at least 50 amino acids in length having at least 50 % identity to the amino acid sequence of SEQ ID NO: 16.

46. An isolated, purified or enriched polypeptide having at least 70% similarity to the amino acid sequence of SEQ ID NO: 16.

47. An isolated, purified or enriched polypeptide of at least 20 amino acids in length having at least 60% similarity to the amino acid sequence of SEQ ID NO: 16.

48. An isolated polypeptide comprising the amino acid sequence of SEQ ID NO: 16.

49. An isolated polypeptide consisting of the amino acid sequence of SEQ ID NO: 16.

50. An isolated, purified or enriched antibody specific for a polypeptide of SEQ ID NO: 16.

51. A composition comprising a bacteriophage 77 ORF 104 polypeptide and a polypeptide comprising the amino acid sequence of SEQ ID NO: 16 or a variant thereof that specifically binds phage 77 ORF 104 polypeptide.

52. A composition comprising a nucleic acid encoding bacteriophage 77 ORF 104 and a nucleic acid comprising SEQ ID NO: 17.